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Article (Accepted Version)

Kern, Florian and Rogge, Karoline S (2018) Harnessing theories of the policy process for analysing the politics of sustainability transitions: A critical survey. *Environmental Innovation and Societal Transitions*, 27. pp. 102-117. ISSN 2210-4224

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Harnessing theories of the policy process for analysing the politics of sustainability transitions: a critical survey

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Abstract

This paper provides a survey of policy process theories and their usefulness in transitions research. Some research has already used such theories, but often in an ad hoc and relatively cursory way and with little attention to potential alternatives. However, it has been argued that transition scholars need to pay more attention to the politics of policy processes. We argue that a critical stocktaking of policy process theories is a prerequisite for future transition studies that more systematically respond to these challenges. Therefore, we review five prominent policy process theories and their applicability in transition studies. We point to two weaknesses of empirical applications of these approaches that are of particular relevance for transitions research: their focus on single instruments or policy packages, and their neglect of policy outcomes. We conclude by suggesting avenues for research on the linkages between policy processes, policy mixes, and socio-technical change.

key words: policy processes, sustainability transitions, politics, policy mix, policy outcomes, policy studies

1. Introduction

Over the past decades, research on how policies can promote environmental innovation and societal transitions has generated a large body of insights which can be drawn upon for driving transitions towards environmental sustainability (del Río González, 2009; van den Bergh, 2016). However, the long-term, dynamic and politically contested nature of change processes associated with sustainability transitions calls for a much more explicit consideration of policy processes in addition to the content of policies (Markard et al., 2012; Weber and Rohracher, 2012). Building on this suggestion, we argue that transition studies should be cross-fertilized by the field of policy studies

that has developed a variety of analytical approaches to analyse policy processes and their outputs¹ (Howlett et al., 2009; Sabatier and Weible, 2014). Transition scholars have so far made relatively limited use of these theories in studies of the politics of transitions (Grin et al., 2011; Meadowcroft, 2011; Scrase and Smith, 2009), even though it is a commonplace to point to the importance of supportive policy instruments (Jacobsson and Bergek, 2011; Wieczorek and Hekkert, 2012) or the necessity of institutional changes (Fuenfschilling and Truffer, 2014). Exceptions include Markard et al. (2016), Geels and Penna (2015), Normann (2015, 2017), Edmondson (2017) or Smith and Kern (2009).

We argue that this is regrettable since including policy processes in the analysis of links between policy and socio-technical change is an important avenue of future research for three main reasons: First, policy processes do not only shape policy strategies and instruments, but can also have direct impacts on innovation which too often has been neglected in past analyses (Rogge and Reichardt 2016, Reichardt et al. 2017). Second, including policymaking and implementation processes into research on the co-evolution of policy and socio-technical change promises to improve our understanding of the dynamic nature and causal links between the two (Hoppmann et al., 2014; Reichardt et al., 2016). Finally, opening up the black box of policy processes may assist in developing policy recommendations that are better informed about the politics of policymaking and implementation and therefore potentially stand a better chance at being adopted and sustained (Rogge and Reichardt 2016; Edmondson et al. 2017).

Given the promising prospects of a more detailed consideration of policy processes in the analysis of sustainability transitions, the aim of this paper is twofold: first, to provide a critical review of different theories of the policy process and their suitability for utilising them in transition studies; and second, to provide meta-reflections on these approaches in the context of the need for a broader understanding of policy in the context of sustainability transitions. To achieve our aims we have chosen five of the most prominent approaches in the field of policy studies for our critical review as these are theoretically mature and have been empirically validated in many different policy fields and regions. Several publications within the sustainability transitions field already loosely draw on these frameworks, but typically without justifying their choice vis a vis alternatives. They also often rely on the 'classic' version of these analytical frameworks, neglecting more recent debates and further conceptual developments. Therefore, in this paper we provide a critical review of these theories of the policy process in which we present the origin, key concepts, empirical applications, recent theoretical advances and most important criticisms. We also offer reflections on their suitability for answering research questions of interest to scholars in the field of transition studies.

Based on this review we argue that there is much potential for cross-fertilisation of ideas across transition and policy studies. However, in the context of sustainability transitions there are two shortcomings: First, these theories are often applied to the study of individual policy instruments, rather than to policy mixes, which are important in transitions as we will argue below. Second, analyses often stop short at the output of policy processes and do not study policy outcomes, which are of course very important for scholars interested in sustainability transitions. Therefore, we conclude that the reviewed theories of the policy process can be of great value in studying the politics of sustainability transitions, but to be able to answer crucial research questions in the field of

¹ Scholars in this literature refer to new instruments, new laws, etc which have been adopted by government as policy outputs and try to explain the decision making processes leading to these policy outputs.

transitions studies they would ideally be extended in scope and/or applied within broader interdisciplinary analytical frameworks.

The remainder of the paper is structured as follows. Section 2 reviews the five selected theories of the policy process. Section 3 discusses two shortcomings of the policy studies literature in the context of research on sustainability transitions. Section 4 concludes with an outlook on future research on the dynamic links between policy mixes and socio-technical change.

2. Sustainability Transitions and Theories of the Policy Process: A critical survey

Explaining policy processes and their outputs in the form of specific policy instruments has long been the domain of the field of policy studies², which is considered a subfield of the wider discipline of political science (Cairney, 2013; Cairney and Heikkilä, 2014; Nowlin, 2011; Schlager and Weible, 2013; Weimer, 2008). Academics in this field analyse the processes of policymaking and policy change and try to explain why certain policies come into being rather than others. To make the complexity of policy processes manageable, the focus of the analysis is often on a subset of key actors regularly involved in policy formulation in a given policy field such as innovation policy or environmental policy. In many of the frameworks, the focus is on coalitions of actors which are competing for influence over policy, but theories differ in the way they conceptualise the ‘glue’ which holds these coalitions together (e.g. common interests, resource interdependencies, shared beliefs or discourses). They also differ in the way they conceptualise power (e.g. whether power is based on the resources actors have at their disposal, or on their ability to shape discourses and develop the ‘best story’, as Fischer (2003) put it), but generally share an interest in which actors get access to policymaking processes and are therefore able to influence policy outputs (i.e. the politics of policymaking).

Many of the key frameworks in the field stem from the 1980s or 1990s and have been utilised and refined over the last decades through extensive empirical work (Cairney and Heikkilä, 2014). Key journals in which debates take place include the *Policy Studies Journal*, *Journal of Public Policy*, *Policy Sciences*, or *Policy & Politics*. Several publications within the sustainability transitions field (e.g. Geels and Penna, 2015; Markard et al., 2016; Normann, 2015; Smith and Kern, 2009), have already drawn on frameworks such as Sabatier’s advocacy coalitions, Kingdon’s multiple streams, Baumgartner’s punctuated equilibrium, or Hajer’s discourse coalitions approach.

However, a critical review of the state of the art of these frameworks and a reflection on their usefulness in the context of sustainability transitions has not been attempted yet. It is exactly such a review and critical understanding of the potential contribution of these approaches that we see as a prerequisite for paying greater attention to policy processes in transitions research. The following sub-sections will therefore review some of the key analytical frameworks in the policy studies field to explain their origin, core concepts, empirical application and methodologies used, recent theoretical advances and most important criticisms as well as their applicability in the field of

² The field is sometimes also called public policy or policy sciences.

transitions. The review covers: Sabatier's advocacy coalition framework, Kingdon's multiple streams approach, Baumgartner's punctuated equilibrium theory, Hajer's discourse coalitions framework, and Pierson's policy feedback approach. These frameworks have been selected as they are amongst the most prominent approaches in the field of policy studies, are theoretically mature and have been empirically validated in many different policy fields and regions of the world. Such a review is hoped to help sustainability transitions scholars to initially orient themselves in the vast field of policy studies and may inform their choice of policy process frameworks.

2.1 Advocacy coalitions framework

Origin of the approach

One of the most well-established frameworks in the field of policy studies is the *advocacy coalition framework* (ACF) which was initially developed by Sabatier and colleagues in the early 1980s (Jenkins-Smith et al., 2014; Sabatier, 1988, 1998; Weible et al., 2011). The framework is designed to understand policy change and stability over periods of a decade or more and draws on classic works in political science, including Heclo (1974, 1978), Majone (1989), Kiser and Ostrom (1982), Putnam (1976) and Simon (1947, 1957).

Key analytical concepts

The core idea of the ACF is that within a given policy subsystem, defined as including all actors which regularly participate in policy formulation processes in a given policy field, there are several advocacy coalitions, consisting of public and private actors, which are competing for influence on policymaking (Sabatier 1988; 1999). One coalition is often dominant in a given policy subsystem and has more influence on policy design. In the ACF actors are conceptualised as being boundedly rational (Jenkins-Smith et al. 2014). Actors within a coalition share a belief system which contains value prescriptions as well as causal theories about how the world works (Sabatier 1988). The ACF distinguishes between three levels in the belief system: "Deep core beliefs are the fundamentally normative values and ontological axioms; they are not policy specific and this can be applicable to multiple policy subsystems. Policy core beliefs are bound by scope and topic to the policy subsystem and thus have territorial and topical components. Policy core beliefs can be normative and empirical...Secondary beliefs deal with a subset of the policy subsystem or the specific instrumental means for achieving the desired outcomes in policy core beliefs" (Jenkins-Smith et al., 2014, p. 191). Dominant coalitions are able to translate their beliefs into policies which are therefore seen as "translations of belief systems" (ibid., p. 192).

Actors within a coalition are hypothesised to show substantial consensus on core beliefs (less so on secondary beliefs), to coordinate their activities and coalitions tend to be stable over time (Sabatier 1988). However, Sabatier and colleagues argue that belief systems of coalitions can gradually change due to policy learning, e.g. based on formal policy evaluations or informal trial and error processes. Yet, core beliefs are very hard to change, while secondary beliefs are more flexible. Since the ACF is a cognitive approach to understanding policy change, it argues that the ideas actors hold matter in terms of the direction of policy change they seek. However, the approach also acknowledges the importance of resources (such as financial resources, information, public opinion, and legal authority)

influencing the ability of a coalition to effect policy change. In addition, policy changes can also be triggered by factors external to the policy subsystem. Key research questions include why and how coalitions form, their structure and stability, and their effect on policy change (Jenkins-Smith et al., 2014; Schlager, 1995; Weible et al. 2011).

Empirical applications and methodology

Sabatier and colleagues developed code forms through which to measure belief systems as well as coalition stability over time (Jenkins-Smith et al., 2014). Key methodologies used are surveys, document and legislative content analysis, and interviews to elicit core beliefs and co-ordinating behaviour. Often studies take a longer-term perspective (Weible et al., 2011; Sabatier 1998). Network analysis techniques have also been used to analyse the composition of the coalitions (Jenkins-Smith et al., 2014). The ACF has been applied to a wide range of policy fields, including climate policy (Boehmer-Christiansen, 1997), offshore oil and gas developments (Jenkins-Smith and St. Clair, 1993), pollution policy (Smith, 2000), transport policy (Henry, 2011) as well as tourism policy (Dela Santa, 2013). Many of these contributions focus on particular changes in existing policy instruments or the introduction of new instruments. In an overview of empirical applications of the ACF framework between 1987 and 2013, Jenkins-Smith and colleagues (2014) found 224 academic publications, with most publications focussing on the environment (128), whereas the rest address health (24), finance/economics (17), social (17), education (13) or technology policy (7). Most of the applications stem from North America (95) and Europe (94).

Conceptual advances and most important criticisms

One of the important early criticisms of the ACF was that it needs to better explain how coalitions form and maintain themselves over time (Schlager, 1995). Her argument was that the existence of coalitions should not be simply diagnosed only by the existence of shared beliefs but also by shared patterns of coordination between actors. Subsequent applications of the framework have therefore increasingly paid attention to the processes of how coalitions coordinate and jointly act to effect policy change (Weible et al., 2011). Other criticisms concerned the applicability of the framework outside of the US context, but numerous applications in other national contexts have since shown the generic utility of the framework.

In terms of recent conceptual developments Nowlin (2011) argues that in the early ACF literature policy change was primarily conceptualised to occur as a result of policy learning or external shocks. However, more recently Sabatier and colleagues have stressed that shocks internal to the subsystem, as well as negotiated agreements between advocacy coalitions can also influence policy change (Weible et al. 2009). Similarly to other policy process theories the ACF has mainly been concerned with the dynamics within policy subsystems, but recent work by Jones and Jenkins-Smith (2009) has argued that also a range of macro-level features play an important role in shaping policy processes which “include clusters of linked sub-systems, public opinion, and policymaking venues. These features constitute the policy topography in which policy actors operate” (Nowlin, 2011, p. 46).

Applicability in transitions research

In a transitions studies context, the ACF has recently been applied to analysing change in Swiss energy policy (Markard et al., 2016). The authors argue that the ACF can be used within transition

studies to better conceptualise policy and politics because its focus on actor coalitions, the importance of external events and cognitive processes all chime well with the socio-technical systems approach, in particular the multi-level perspective. Empirically, their analysis focusses on the 'Energy Strategy 2050', which is a policy package including a variety of policy instruments. Some of the ACF ideas have also been drawn on in Geels and Penna (2015) to better conceptualise the politics of policymaking within the dialectic issue life cycle model.

One area where we think the ACF can further enhance thinking about the politics of transitions is for example the concept of policy regimes in the MLP which was introduced in Geels (2004) but has received relatively little attention since. Geels proposes that different social groups (e.g. technology designers, policy makers, scientists, financial players, or users) have their own set of rules, meet in separate spheres (e.g. their own set of specialised conferences) and therefore form their own 'regimes' but that the different regimes are linked through meta-coordination in the form of socio-technical regimes. He posits that "ST-regimes do not encompass the entirety of other regimes, but only refer to those rules, which are aligned to each other" (Geels 2004, p.905). We argue that the ACF can help us better analyse how such ST-regimes form if we apply its thinking about how advocacy coalitions emerge across a range of relevant actor types involved in policy processes beyond policy actors. Also studying how actors form coalitions and coordinate their activities can help explain how the meta-coordination referred to by Geels emerges in practice. While policymaking processes certainly have their own logics and dynamics, we think the singling out of different 'regimes' by actor type is unhelpful when trying to study the politics of policy processes as part of transitions where a coalition perspective is very relevant. There is also work on analysing under which circumstances coalition members 'defect' from their coalition (Weible et al. 2009) which is of interest in the context of transitions.

More generally, the ACF literature offers interesting conceptual ways to understand how policy beliefs can change over time, which could be useful for transition researchers. The updated version of the ACF mentions two additional possibilities (on top of external events and policy-oriented learning): internal subsystem events which highlight failures in current subsystem practices or through negotiated agreements, involving two or more coalitions. Such cross-coalition learning is more likely to happen "where 'professional forums' provide an institutional setting that allows coalitions to safely negotiate, agree, and implement agreements" (Weible et al. 2009, p. 124). Exploring both of these pathways empirically in a transitions context seems promising. Also the acknowledgement of the importance of the role of public opinion within the ACF can offer fruitful inspirations for transition research on under-investigated issues around how wider public opinion influences policy choices (rather than e.g. lobbying by incumbents).

2.2 Multiple streams approach

Origin of the approach

Another prominent theory of the policy process is Kingdon's multiple streams approach (MSA). It was developed in the US, analysing agenda setting processes in the fields of health and transportation policy in the 1980s and draws inspiration from organisational theory (Zahariadis, 2014). Its main research question is how a certain issue makes it onto the (national) political agenda,

how alternative courses of actions come about, and why some issues or alternatives never receive any attention from government officials and closely related actors (Kingdon, 1995; Zahariadis, 2008). The MSA approximates the dynamic, complex and chaotic nature of policymaking and rejects theories based on rational behaviour (Zahariadis, 2014).

Key analytical concepts

The MSA proposes three streams within policy systems (problems, policy/solutions, and politics) which are relatively independent of each other and follow their own timescales and rules, but from time to time interact to form ‘windows of opportunity’ for policy change (Kingdon, 1995; Zahariadis, 2014). The problem stream contains perceptions of public problems that should be addressed by government. These problems could, for example, be budget deficits, environmental pollution or rising medical costs, and often come to the fore because of crises or evaluations of existing programmes which attract public or media attention. The policy stream consists of solutions which are developed by analysts and experts in specialised policy communities. Such networks “include bureaucrats, congressional staff members, academics, and researchers in think tanks who share a common concern in a single policy area, such as health or environmental policy” (Zahariadis, 2014, p. 33). These experts narrow down the potential solutions to a small subset of options which are proposed once there is political interest in the problem. Finally, the politics stream includes public discussions, changes in governments or legislatures, or interest group lobbying.

Policy entrepreneurs can strategically use certain moments (‘windows of opportunity’) to couple together the three streams in order to achieve policy change. Kingdon (1984, p. 21) defines policy entrepreneurs as “people who are willing to invest their resources in pushing their pet proposals or problems, are responsible not only for prompting important people to pay attention, but also for coupling solutions to problems and for coupling both problems and solutions to politics”. According to Béland and Howlett (2016), the concept of policy entrepreneurs emphasises the central role of agency within the MSA. ‘Windows of opportunity’ open through important developments within the politics stream (e.g. a change in government) or by the emergence of significant problems becoming visible through focussing events (problem stream). These focussing events allow actors to frame certain conditions as problematic. A dedicated literature addresses how actors strategically exploit crises and the ensuing framing contests (Boin et al. 2009). Importantly, MSA scholars argue that in the absence of well-developed policy solutions, windows can be missed.

Empirical applications and methodology

As with the ACF, this framework adopts a cognitive approach which argues that “ambiguity is an integral part of the policy-making process” (Zahariadis, 2008, p. 515). Kingdon’s original study was mainly based on interviews with policymakers and other actors involved in health and transportation policy communities as well as government document analysis. Many later studies – typically detailed case studies (e.g. Robinson and Eller, 2010) – use the same methodology (Cairney and Jones, 2016). Although the MSA was initially developed in order to study agenda setting processes in the US, it has subsequently also been applied in a range of other settings, including comparative research. There are now more than 300 cases which have been analysed using the MSA (Béland and Howlett, 2016). For example, the MSA is very popular for analysing messy policy change processes within the European Union as a complement to rational institutionalism approaches (Copeland and James, 2014; Zahariadis, 2008) and has been applied to the higher education domain (Ness and Mistretta

2009). Typically, applications explain the adoption and/or design of a new policy instruments (such as merit aid scholarship programmes funded by state lotteries in Ness and Mistretta 2009) or the adoption of wider policy strategies (such as the Europe 2020 strategy in Copeland and James 2014).

Conceptual advances and most important criticisms

One of its key finding is that often solutions chase problems, rather than the other way round as is assumed by rational choice theories. The latter assume that when a problem comes up, suitable policy solutions are developed, whereas MSA scholars argue this can be the case when a window opens up in the problem stream (e.g. a flood or a hurricane leading to policy change through emergency response processes). However, if a window opens up in the politics stream (e.g. through an election), “attention is focused on solutions first before problems can be clearly defined. In such cases the process is ideological – that is, policies are made in search of a rationale. What matters more is the solution to be adopted rather than the problem to be solved” (Zahariadis 2014, p. 37). Privatisation in the UK is a case in point of a policy in search of a rationale.

In addition, the approach traces the dynamics of policy change over time and the role of interpretation processes therein. Recent work extends the theory “beyond agenda setting by offering empirical insight into policy design choices” (Nowlin, 2011, p. 46). Advancements have been made to cover agenda setting, decision making and implementation (Zahariadis 2014). For example, while not without criticism (Breunig et al. 2016), Howlett et al. include policy implementation by adding a process stream and a programme stream, with the latter referring to the “calibration of all the policy instruments (regulations, finance etc.) that make up the broader ‘policy’” (Howlett et al. 2016, p. 280) which opens up conceptual possibilities for paying more attention to policy mixes (see 3.1).

The MSA has been criticised for its lack of testable hypotheses and the claim of the three streams being independent (Cairney and Jones, 2016; Copeland and James, 2014; Robinson and Eller, 2010). While many of the metaphors used in the MSA appear compelling, the question is “how far or in what circumstances they, and any framework developed from them, might apply” (Béland and Howlett, 2016, p. 223-224). Cairney and Jones (2016) conclude that most empirical applications insufficiently engage with broader policy theory and are mainly interested in understanding the empirical case. They argue that these trends are largely due to the MSA’s intuitive appeal and low ‘barriers to entry’.

Applicability in transitions research

The MSA has already been applied to the study of offshore wind politics in Norway (Normann, 2015) for understanding why windows of opportunity open and close and how they can be exploited by actors. While this concept is already central in the MLP some of the broader conceptual thinking of the MSA ‘got lost’ when it was initially transferred. Elzen et al. (2011) also loosely draw on some of Kingdon’s ideas and use the MSA “to argue that normative pressure is more likely to lead to regime change if alignments with other developments (in markets, regulations and technology) create a ‘package’ between problems and solutions that is attractive to various stakeholders” (p. 264). Recent thinking about the politics of protective space (Raven et al., 2016) also builds on the idea that solutions need to be coupled to problems, but without explicitly referencing Kingdon. The point that

problems often follow solutions rather than the other way around, and that policymaking is therefore not a rational problem solving exercise, is important to keep in mind when developing policy recommendations: it suggests that simply providing 'the evidence' is not sufficient, but that questions of timing and a sensitivity to developments in the politics stream are crucial for success. Finally, the attention of the MSA to policy entrepreneurs, and hence a focus on agency, is very useful in a transition studies context where (especially early) studies have often paid too little attention to agency (exceptions include e.g. Grin et al., 2011; Farla et al. 2012).

2.3 Punctuated equilibrium theory

Origin of the approach

A third very well established policy process theory is Baumgartner's punctuated equilibrium theory (PET) which was developed in the late 1980s/beginning of the 1990s to explain policymaking in the US (Baumgartner et al., 2014; Baumgartner and Jones, 1993; Jones and Baumgartner, 2012). Baumgartner and colleagues tried to develop a model explaining a very common observation: that policy is generally marked by stability and incremental changes, but that occasionally political processes produce drastic policy changes. The key argument is that policy developments normally follow along similar lines (equilibrium) unless there is a big external event or crisis triggering significant change (moment of punctuation). The authors argue that being able to explain both equilibrium and punctuation is the main advantage of the PET compared to other approaches that have focussed on explaining either stability or change.

Key analytical concepts

PET emphasises issue definition and agenda setting elements in the policy process, with two factors being key: political institutions and bounded rationality of decision-making. For example, the US political system is characterised by separated institutions, overlapping jurisdictions and relatively open access for proponents of policy change. According to Baumgartner, these features combine into a dynamic between the politics of subsystems and the macro politics of Congress and the Presidency, thereby normally militating against change but sometimes reinforcing it. Like Kingdon's MSA, PET posits that policymakers are boundedly rational, meaning they have imperfect information and limited time to process information (Baumgartner et al., 2014, pp. 60–61). Given these constraints, policymakers are unable to consider all issues at all times and settle on their impressions of the best choice. According to Cairney and Jones (2016, p. 6), the "boundedly rational actor assumption allows evolutionary models such as PET to model institutional-level attention as a driving force of public policy".

One of the key ideas in PET is that normally policy is decided within policy subsystems (often leading to minor, incremental policy change) but when there is significant contestation (for example by new emerging interest groups as proponents of change) an issue shifts to the macro-political institutions (e.g. Congress or the President), potentially leading to major policy changes (punctuations): "The intersection of the parallel-processing capabilities of the policy subsystems and the serial-processing

needs³ of the macro-political system creates the nonincremental dynamics of lurching that we often observe in many policy areas” (Baumgartner et al., 2014, p. 63).

Empirical applications and methodology

While PET was developed in the US, many applications in countries around the world have confirmed aspects of the theory to be applicable more widely (Baumgartner et al., 2014). While most research using the PET has focused on case studies analysing the processes of punctuations and stability in a given policy field, some research has also statistically analysed the relative frequency and magnitude of policy changes. For example True, Jones and Baumgartner (1999) analysed budgetary changes in US federal programmes and showed that their distribution was not normal, but was characterised by an excess of large changes and small changes which they read as supporting the PET (Robinson et al., 2007). However, critics argued that the “Theory does not predict when, precisely, punctuations will occur or when equilibrium returns after a punctuation. [...] Any particular policy history in which one sees change can be called confirming evidence. Any policy history in which one sees stability can also be seen as confirming evidence” (Robinson et al., 2007, p. 141). Instead, they propose multivariate hypothesis testing and argue that testing the theory requires a large data set. However, much of the existing empirical applications in case studies focus on explaining stability and change of policy (such as the introduction of the 2008 Climate Change Act in the UK and its implementation through the Low Carbon Transition Plan which was argued to be a radical departure from the previous Climate Change Programme, Carter and Jacobs 2014). Other applications include studying the diffusion of specific policy innovations (Boushey, 2012).

Conceptual advances and most important criticisms

Recent PET developments involve the inclusion of a general theory of information processing in the policy process (Baumgartner et al., 2014; Jones and Baumgartner, 2012; Nowlin, 2011). Jones and Baumgartner (2012, p. 7) explain: “Policymakers are bombarded with diverse information from many different sources, with varying reliabilities. [...] Policymakers, as boundedly rational decision makers with human cognitive constraints, focus on some of this information and ignore most of it. This selective attention process has critical consequences for [...] how the political system prioritizes problems for policy action”. One rather harsh criticism of the approach is that although the model can be empirically tested and “there is a coherent story behind the model, it is not, I think, one that brings much useful enlightenment to our understanding of the policy process beyond more narrowly focused models” (Weimer, 2008, p. 491). Weimer argues in favour of more narrow frameworks because he sees them as being better able to provide predictions of the outputs of specific policy processes. He sees a tension between approaches helpful in explaining policy processes and theories with practical value in informing actors involved in policymaking. This seems a similar debate to the one which takes place in transitions studies about the role of researchers and whether we seek to mainly explain transition processes or whether analysis should also provide advice to policymakers.

Applicability in transitions research

³ Baumgartner et al. (2014, p. 63) explain serial-processing as a process “whereby high-profile issues are considered, contested and decided one – at the most a few – at a time”. In contrast, parallel-processing refers to the capability of the political system that thousands of issues can be considered simultaneously within their distinct policy communities made up of experts.

Geels and Penna (2015) have already loosely drawn on the PET approach in their development of the Dialectic Issue Life Cycle model, utilising the idea that an issue which shifts to the macro-political institutions can experience major policy change: “More substantive policy change ... often requires a ‘heating up’ of the problem (through drama, shocks, scandals), which pushes it into the macro-political arena, where major policy change can be enacted” (Geels and Penna, 2015, p. 70).

From a transitions perspective it is clear that the approach closely chimes with the idea of transitions characterised as path dependent phenomena that can be disrupted by crises (e.g. landscape events). Baumgartner et al. argue that “Complexity in political systems implies that destabilizing events, the accumulation of unaddressed grievances, or other political processes can change the “normal” process of equilibrium and status quo based on negative feedback (which dampens down activities) into those rare periods when positive feedback (which reinforces activities) leads to explosive change for a short while and the establishment of a new policy equilibrium” (2014, p. 60-61)⁴. This thinking is very much in line with thinking about transitions, indicating much potential in combining the PET with transition concepts. The PET has also been used to study the diffusion of public policy innovations (Boushey, 2012) which is also of interest to transitions scholars. For example, the diffusion of solar PV technology closely coincided with the diffusion of German style feed-in tariffs across Europe (Busch and Jörgens, 2011). We argue that this kind of linkage between policy developments and socio-technical change deserves more systematic research attention.

The focus of the PET on political institutions is also promising given the interest in institutions and institutional change as important parts of transitions (Fuenfschilling and Truffer, 2014). The PET approach created important insights about the processes through which new actors can ‘break into’ policy fields dominated by incumbent interests and how incumbents seek to maintain their control (Baumgartner et al. 2014). Lastly, the intellectual roots of the PET partly lie in the study of complex systems which also features prominently in transition management (Frantzeskaki and Loorbach, 2010; Loorbach, 2010) which offers further potential for cross-fertilisation.

2.4 Discourse coalitions

Origin of the approach

Like in many other fields of social science inquiry, there has also been an interpretative turn in policy studies. Some research on narratives in public policy adopts a post-positivist perspective (Fischer and Forrester 1993; Fischer 2003), while others follow a more positivist perspective (Jones and McBeth, 2010; McBeth et al., 2014). Especially in studies of environmental policymaking, there is a rich diversity of approaches that focus on narratives, discourses, or frames (Hajer and Versteeg, 2005). A review of this diverse field of work is beyond the scope of this paper. We therefore focus on one well-known approach, which has already been applied in the sustainability transitions context: Hajer’s discourse coalitions framework (1995). Hajer’s seminal study developing the approach was concerned with the policy responses to the problem of acid rain in the 1990s. The key argument is that the way actors define issues through shared discourses influences their recognition as public

⁴ The notion of positive and negative feedbacks is similar to the one which has been developed further into a policy feedback theory which will be covered in section 2.5.

policy problem and the subsequent policy response. Discursive features are essential attributes of policy fields and neglecting them “leads to unduly optimistic and in fact rather technocratic thinking about policy change” (Hajer, 1995, p. 275).

Key analytical concepts

Discourse coalitions are a key concept in Hajer’s approach. Similarly to the ACF, Hajer suggests that in any policy field there are different coalitions competing for policy influence of which one is normally dominant. What glues the coalition together is the use of a shared discourse. The framework is used to analyse how discourse coalitions form around shared storylines (defined as “generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific physical or social phenomena”, Hajer, 1995, p. 56), how they compete for political influence and how discourses structure the solutions offered to the policy problems they ‘create’. Discourse analysis foregrounds the role of language in politics through paying attention to the specific situational logic in which a particular account of problem and solution arises (Hajer and Versteeg, 2005). However, Hajer’s discursive analysis is not only about ‘talk’: it is about the way language shapes political action and practices.

Empirical applications and methodology

The framework is often applied to environmental policy processes (see Hajer and Versteeg 2005 for a review) but has also been applied to policy fields such as software patent conflicts (Leifeld and Haunss 2012) or agri-food policy (Lee 2013). Many empirical applications of the framework focus on national policymaking, but the framework has also been applied at EU or international levels. For example, Epstein (2005) draws on Hajer’s framework to analyse how a global anti-whaling storyline was crafted and an anti-whaling discourse coalition emerged, investigating the involved actors (e.g. NGO activists) and impacts on international regimes (the commercial anti-whaling moratorium of 1982). Another example is a study, which applies Hajer’s framework to analyse the development of REDD+ (Reducing Emissions from Deforestation and Forest Degradation) under the United Nations Convention on Climate Change (den Besten et al., 2014). Their analysis shows how competing discourse coalitions struggled over the definition and scope of REDD+, about the use of markets, and about social and environmental safeguards. These applications in different policy fields and on different policy levels show the versatility of the framework. Given the focus of the framework on discourse, most studies apply some form of interpretative textual analysis to case studies of specific policy changes. There are also recent attempts to develop discourse network analysis as a new methodology for the study of policy debates (Leifeld and Haunss 2012).

Conceptual advances and most important criticisms

A core strength of discursive approaches is its demonstration that politics can be understood as “a struggle for power played out in significant part through arguments about the ‘best story’” (Fischer, 2003, p. x), thereby highlighting problems with traditional explanations focussing exclusively on interest-driven politics. However, one of the criticisms of the approach is that it does not pay enough attention to the wider institutional context within which policymaking occurs (Kern 2011; den Besten 2014). Kern therefore proposed to enrich Hajer’s approach with concepts from Schmidt’s discursive institutionalism, which combines attention to discourses and the processes through which actors

create and deliberate ideas, with attention to the wider institutional context within which discursive processes occur (Schmidt, 2011). Similarly, den Besten et al. (2014) combine Hajer's concept of 'discursive hegemony' with discursive institutionalism using the policy arrangement approach (Arts et al., 2006) which highlights four analytical dimensions: discourses, actors, power and rules in a policy field and the broader institutional context of policymaking. They further develop the discursive-institutional approach by introducing the concept of 'discursive-institutional spiral' referring "to the dynamic process of institutionalisation of discourses on the one hand and the opening up of discourses in response to these institutionalisation processes on the other" (2014, p. 41). Also Gillard (2016) applies a discursive institutionalist framework to the study of UK climate change policy under the Conservative-Liberal coalition government (2010– 2015).

Discursive analytical approaches have been criticized for having little additional explanatory value as ideas are simply seen as aligning with the interests of actors and therefore have little to add to the analysis of policy processes: "For sceptics – variously realists, materialists, and often rationalists – ideas do not matter, as power and material interests ultimately drive politics" (Price, 2006, p. 252). However, Kern (2011), drawing on Blyth (2002), argued that in the context of transitions actors are often unsure about their long term interests or strategies to meet them, suggesting an important role for discourses in making sense of an uncertain future. Another criticism from positivist scholars like Sabatier has been the failure to meet his criteria for theory development, including that any approach needs to be 'clear enough to be wrong' (Sabatier, 1999). This has stimulated the development of the narrative policy framework which takes discourses seriously but tries to meet all of Sabatier's criteria and proposes a number of testable hypotheses (Jones and McBeth, 2010; McBeth et al., 2014).

Applicability in transitions research

Smith and Kern (2009) have used Hajer's framework to explain the adoption of transition management ideas into Dutch environmental policy. They argued that a coalition of policymakers, academics and consultants co-developed a powerful transitions storyline with sufficient interpretive flexibility to appear attractive and non-threatening for policymakers and businesses. Also Geels (2014) draws on Hajer's work to conceptualise how regime incumbents can resist challenges by social movements and other groups by forming powerful discourse coalitions with policymakers. Rosenbloom et al. (2016, p. 1286) recently developed a novel analytical approach on multi-dimensional discursive interactions which "explicitly links discourse and transitions, bringing together actor groups depicted in the MLP, the socio-technical features of innovations, contextual developments occurring within the landscape, and the formation of storylines". Based on their analysis of struggles around the deployment of PV in Ontario they argue that exogenous elements of the landscape "may be endogenized through political struggles. Within episodes of political contest, the landscape can be understood as a latent potential that can be creatively and selectively interpreted by actors in order to develop legitimacy building or eroding narratives, placing pressure on opponents [...] the way in which the landscape is endogenized through the ideational activities of these agents [...] is an important part of transitions that merits further attention" (Rosenbloom et al., 2016, p. 1286).

We argue that the focus on interpretative processes and the roles of ideas in shaping policy, especially in a context where actors might find themselves in situations of Knightian uncertainty, is very promising for transitions research. We agree with Rosenbloom et al. that foregrounding

discursive struggles between competing discourse coalitions is a useful conceptual tool to focus on the politics of transition processes, the positioning of actor networks within these processes, and how different actors interpret sustainability and the goals of potential transitions differently.

2.5 Policy feedback theory

Origin of the approach

While the other policy process theories described above mainly focus on how factors exogenous to public policy itself (such as lobbying by interest groups) shape policymaking and policy outputs, the key idea of policy feedback theory (PFT) is that the creation of new policies “occurs in a context that is deeply influenced by already existing policies” (Mettler and Sorelle, 2014, p. 151). Therefore, its key question is: “How do policies once created, reshape politics, and how might such transformations in turn affect subsequent policymaking?” (ibid). Research on policy feedback effects can be traced back to work by Schattschneider in the 1950s and Lowi in the 1960s. Their research showed that “policies of different types generate different patterns of political mobilization. The central insight was that public policies are not merely products of politics but also shape the political arena and the possibilities for further policy making” (Campbell, 2012, p. 334). PFT draws on historical institutionalism (Béland, 2010) and more specifically the idea of path dependency and processes of increasing returns in institutions and public policies (understood as self-reinforcing, positive feedback processes).

Key analytical concepts

A seminal author in PFT is Pierson (2000, 1993). He argues that while legacies affect politics and subsequent policymaking, it is important to specify *how* legacies matter, for example by specifying through which mechanisms earlier policies shape later ones. He argued that previous research on policy feedback had been too much focussed on illustrative case studies, and therefore outlined a research agenda for moving towards a more systematic investigation of propositions about how and when policies are likely to cause changes in politics. In his agenda setting 1993 review article Pierson argues that policies provide resources and create incentives for political actors. He claims that such effects can influence the political behaviour and capacity of government elites, interest groups and mass publics, arguing that the influence on mass publics might well be the most important but understudied political consequence.

Pierson distinguishes two main types of policy feedback effects: *resource effects* and *interpretive effects* altering the capacities and interests of actors. First, resource effects can be direct or more indirect. The former arises when a policy creates funding for a particular interest organisation or channels funding to certain interest groups. As an example for the latter he cites the case of Swedish labour unions in which the policy design gave unions control over unemployment benefits, thereby creating a strong incentive to join unions.

Second, interpretive effects are “the impact of policies on the cognitive processes of social actors” (Pierson 1993, p. 610). An example is policy learning from current public policies in which (perceived) successes or failures shape future policy. This thinking is closely linked to the idea of policy paradigms (Hall, 1993) and often focuses on policy elites (government and interest groups). However,

Pierson (1993, p. 619) argues that interpretive effects can also influence mass publics: “While policy-learning arguments see policies as the source of models or analogies for policymakers, what is likely to be important for mass publics is the informational content of policies”. Policies can act as focussing events and the specific design of policies may increase the visibility of some social and political connections while obscuring others. As some policies (e.g. those involving public expenditure, like manned space flights) are more visible than others (e.g. tax codes giving tax breaks to wealthy individuals), these often lead to more public awareness or mobilisation, thereby potentially creating focussing events.

Empirical applications and methodology

Much research on policy feedback effects (especially on mass publics) focuses on social welfare policy in the US, and Europe to a more limited extent (Pierson, 1993), but the approach has also been applied to taxation, voter registration, the military draft (Campbell, 2012) and climate policy (Jordan and Matt, 2014). Most research analyses effects of policies on political behaviour or on political attitudes. Where political attitudes are researched, there is often very little evidence to suggest that policies can change them (Campbell, 2012, p. 336). In terms of methodologies, Pierson (1993) pointed out that much of the early research on policy feedbacks, inspired by historical institutionalism, draws on detailed historical case studies and process tracing. Therefore, he suggested that drawing on other traditions, especially rational choice theory with a focus on individual behaviour, would also be beneficial. He also stressed the importance of cross-national comparative work to uncover the impacts of policy feedbacks. While many studies using the PFT analyse single instruments (such as the design, implementation and eventual replacement of the EU voluntary agreement on CO₂ emissions for new cars, Jordan and Matt 2014), others have drawn attention to the importance of considering several instruments of whole policy packages (Weaver 2010; Oberlander and Weaver 2015).

Conceptual advances and most important criticisms

Research has identified a range of beneficial design aspects of policies for creating positive feedbacks on mass publics: these include the size of the benefits provided by policy, their visibility and traceability, the proximity and concentration/diffusion of beneficiaries, duration of benefits, and programme administration (Campbell, 2012). The PFT literature also increasingly acknowledges the existence of negative (undermining or destabilising) feedbacks while early research focused mainly on positive, self-reinforcing feedbacks (Jordan and Matt, 2014; Weaver, 2010). For example, Campbell (2012) points out that negative policy experiences can work to undermine, rather than enhance political participation. She cites the case of the American social assistance program for families with dependent children where the level of benefits was too low to make a positive difference (resource effects) and the administration of the programme through case workers was perceived as arbitrary, which undermined trust in government (interpretive effects) and political participation of recipients. Béland (2010) identified three promising strands of recent PFT work: 1) applying the concepts to the study of private rather than only public institutions; 2) systematically bridging the literatures on policy feedback and on political behaviour and 3) exploring the ideational

and symbolic components of policy feedback. Within the latter strand, a promising new concept of symbolic policy feedback has been proposed.⁵

One shortcoming in the PFT literature is the lack of a systematic analysis of the conditions under which feedbacks emerge. Patashnik and Zelizer (2009) argue that feedbacks can fail to materialise because of bad policy design, inadequate or conflicting institutional supports, or poor timing. Despite Pierson setting out a PFT research agenda to investigate systematically how and under which conditions policies trigger feedback effects (Pierson, 1993), according to Campbell (2012, p. 334) “outstanding questions linger as to the mechanisms and conditions under which feedbacks emerge. There are also continuing methodological concerns about inference and causality”. However, she also praises the approach for bringing together the concerns and methods of historical institutionalism and political behaviour, and for bringing attention to citizens into historical institutionalism research, while acknowledging that the “result can be a messy, multilevel amalgam, but it provides rich insights into the actual workings and consequences of political systems” (ibid). According to Béland (2010, p. 582), “What some of the current policy feedback literature suffers the most from is a lack of analytical clarity about the respective role of—and the interaction between—the types of causal mechanisms through which policies influence politics and policy making”.

Applicability in transitions research

So far, in transitions research the PFT has only been applied by Edmondson et al. (2017) who conceptualise the co-evolution between policy mixes and socio-technical systems by differentiating between a number of positive and negative policy effects and feedback processes. They argue that the interplay between these processes shapes the development of the socio-technical system as well as the further development of the policy mix. The paper illustrates the approach with empirical material from the case of the UK low carbon buildings transition.

More generally, some of the strengths of PFT are that it has sometimes been used to cover more than one instrument, that it allows to bring in the political effects of policies on target groups as well as mass publics and that its focus on political dynamics (policy shaping politics, which shape further policy) fits well with research interest into the politics of transitions. One of the key ideas of PFT that “[p]ublic policies do not arise in a vacuum but are shaped in profound ways by earlier policy” (Campbell, 2012, p. 334), is of course very familiar to transition studies with its attention to path dependency.

Following Campbell’s line of argument above, another promising feature is the combination of historical institutionalism with research on publics. While publics can play a key role in shaping transitions, there is relatively little research on mass publics and their role in the politics of transitions. The idea that policies can lead to different patterns of political mobilization and that

⁵ In the words of Béland (2000, p. 580), “this recent literature is innovative because it offers detailed analyses of how ideas and symbolic categories grounded in existing policy legacies can influence legislative outcomes while empowering (or weakening) the actors who draw on these ideas and categories. For example, in a recent book about the U.S. welfare debate during the late 1960s and the 1970s, Brian Steensland (2008, p. 238) shows that President Nixon’s Family Assistance Plan (FAP) came close to being enacted but the fact that it “brought into the same program categories of the poor who had been previously treated as undeserving and mixed them with deserving populations” considerably weakened support for it while providing opponents with culturally resonant ideological weapons they mobilized against FAP”.

they can also shape the political arena and therefore the possibilities for further policymaking is a very powerful one, and arguably very relevant in the context of transitions. The whole idea of transition policies is to shift political power away from incumbents and enable institutional change favourable to niches (Avelino and Rotmans 2009; Raven et al., 2016). A well-known example of this kind of process has been described in the case of the German energy transition where the feed-in-tariff policy led to a new political constituency (renewable energy companies) which forged coalitions with green groups and received support from mass publics in favour of renewables (Jacobsson and Lauber, 2006). Conversely, transition policies can also lead to the mobilisation of incumbents or other actors trying to defend the status quo. Therefore, applying PFT to study the role of policy in shaping political mobilization, including but not limited to mass publics, and thereby also the possibilities for further policymaking, seems very promising.

2.6 Summary

Table 1 provides an overview of the five different policy process theories for which we discussed their strengths, weaknesses and applicability in the field of transition studies.

	Advocacy coalition framework	Multiple stream approach	Punctuated equilibrium theory	Discourse coalition framework	Policy feedback theory
Scope and Level of analysis	Advocacy coalition interaction, learning and policy change Coalitions and subsystems	Policy choice under ambiguity System, but implicit, and focus is on actors coupling streams	Political system towards stability and periodic major change System	Discourse coalition interaction, discursive struggles Coalitions and subsystem	How policies shape politics and subsequent policymaking System, but implicit
Model of the individual	Bounded rational; emphasis that individuals are motivated by beliefs and prone to devil shift	Challenges assumptions of comprehensive rationality; focus on ambiguity	Boundedly rational, particularly related to attention	Not explicitly discussed	Not explicitly discussed; suggests individual choice is shaped by policies and institutions
Actors making choices	Policy actors who form coalitions, act strategically, learn and so forth	Policy entrepreneurs and policymakers	Broadly, interest groups and other organisations, as well as individuals within groups and different venues	Policy actors who form coalitions and engage in a set of practices	Implicitly, actors who are affected by policy may in turn become policy actors
Relationship among key concepts	Factors that influence coalition formation, policy learning, and policy change	Broadly, three streams that come together during 'windows of opportunity' to cause major policy change	Factors that lead to major policy change and those that constrain change or produce incrementalism	Discourses are reproduced through practices and influence the policy response to policy problems as well as whether certain situations are seen as public policy problems	The effects of public policy on the meaning of citizenship, form of governance, power of groups, and political agendas – all of which affect future policy

	Advocacy coalition framework	Multiple stream approach	Punctuated equilibrium theory	Discourse coalition framework	Policy feedback theory
Most promising aspects from transition studies perspective	<p>Reconceptualise policy regime, incl. competing advocacy coalition(s) and integrate how beliefs can change over time and with what effects on dominant advocacy coalition</p> <p>Incorporate role of public opinion on policymaking</p>	<p>Focus on policy entrepreneurs sheds light on role of individual agency vis a vis systems</p> <p>Idea that solutions/ policies look for problems is useful in studying agency of niche actors pushing their respective solutions, but also requires detailed analysis of developments in politics stream</p>	<p>Clear parallels in conceptualising equilibrium and path dependency which can be disrupted by crises in both PET and MLP: scope for mutual learning about mechanisms of change</p> <p>Approach can be also applied to diffusion of public policy innovations which is useful in the context of TIS studies trying to account for transnational factors and institutional political contexts</p>	<p>Focus on interpretative processes and the roles of ideas in shaping policy, especially in situations of Knightian uncertainty, is very promising</p> <p>Foregrounding discursive struggles between competing discourse coalitions is a useful conceptual tool to focus on the politics of transition processes (e.g. on how actors interpret sustainability and the goals of potential transitions differently)</p>	<p>Promising approach to conceptualise the co-evolution between policy mixes and socio-technical systems (via policy effects and feedback processes)</p> <p>Extend notion of path dependency of policy regime by paying attention to various policy effects as well as feedbacks</p> <p>Utilise approach to conduct analyses of effects of policies on mass publics and their political mobilisation in transitions</p>
Application in transitions literature	Markard et al. 2016; Geels and Penna 2015	Normann 2015; Elzen et al. 2011	Geels and Penna 2015	Smith and Kern 2009; Rosenbloom et al. 2016	Edmondson et al. 2017

Source: based on Cairney and Heikkilä (2014), with additions from authors (row on transition studies and column on discourse coalitions)

Our review shows that all of these policy process theories can be drawn upon more for investigating the politics and dynamics within sustainability transitions. The choice regarding which of these theories (or other policy process theories) to utilise largely depends on the research focus and question at hand, and requires a critical appreciation of their respective strengths and weaknesses. For example, some of these approaches are more focused on explaining agenda setting processes (e.g. multiple streams approach, punctuated equilibrium theory), while others are used to understand all stages of policymaking. Some of the theories focus more exclusively on policy makers and stakeholders routinely involved in policymaking (e.g. advocacy coalition framework, multiple streams approach), while others also include the influence of mass publics potentially affected by policy (e.g. policy feedback theory).

The choice of policy process theory will also be influenced by ontological and epistemological preferences of the researcher utilising them: some of the approaches sit much more comfortably with a positivist, rational choice (even if bounded) understanding of the world which foregrounds diverging interests of actors (e.g. multiple streams, policy feedback theory), while others are closer to a post-positivist, more interpretive understanding of the world in which cognitive processes and the role of ideas are seen as critical in explaining change (e.g. discourse coalitions approach). While we believe in the potential of more interpretive approaches in the context of transitions where there is much uncertainty, we disagree with Geels' claim that there is limited potential in cross-overs between transition theories and rational choice ontologies (Geels 2010), because realist/materialist explanations have much to say about current power structures and how they affect policy and transition processes.

In addition, and despite their differences in focus and underlying assumptions, there is also potential for combining different policy process theories, either through synthesis, complementary use or contradiction (Cairney, 2013). There are examples of studies that apply several theories alongside each other to complement their focus. For example, Lorenzoni and Benson (2014) use discursive institutional analysis alongside Kingdon's streams model and argue that by analysing discursive interventions in addition to structural determinants of policy processes, important new insights can be obtained about the conditions under which policy and institutional change can occur. Such complementary use of several policy theories – or using different theories to contradict/contrast findings (e.g. see Smith 2000) – might also be useful in transitions research. Overall, we argue that applying theories of the policy process within the field of transition studies would allow for a much more explicit consideration of policy processes rather than only the content of policies, thereby enabling more politically sensitive insights and policy recommendations.

3. Discussion

Our review of five key theories of the policy process shows that they can usefully inform research on the role of politics and policy processes in transitions in a variety of ways. However, we see two shortcomings that should be addressed if such an interdisciplinary approach is to bear ample fruit for studying the link between policy and sustainability transitions: first, the applications of these theories often focus on explaining the emergence of single policies or policy packages, but have so far largely neglected to explicitly address messy, real-world policy mixes; second, studies rarely consider the impact of policy processes and policy outputs on socio-technical change which is of course of interest to transition scholars. We argue that addressing these two shortcomings in an

interdisciplinary manner will enable novel insights and enhanced policy recommendations for governing sustainability transitions. Therefore, in the following, we discuss these two shortcomings and suggest areas for future research.

3.1 The neglect of the analysis of policy mixes

Our critical review of policy process theories reveals that these have only in exceptional cases been applied to explaining the evolution of messy, real-world policy mixes, but instead typically focus on explaining the emergence of single policy instruments or in some instances also purposively designed policy programmes (what in the literature sometimes has been referred to as policy packages, e.g. Givoni 2014). More importantly, none of these frameworks – apart from PFT and to some extent the revised MSA approach (Howlett et al. 2016) – specifically recognise or conceptualise that policy instruments may interact with others and how messy policy mixes (including instruments, strategies and goals) emerge and change over time and with what consequences. This is at odds with the emergence of rich policy mix thinking among academics (Kern et al. 2017; Quitzow, 2015; Rogge and Reichardt, 2016) and policymakers interested in sustainability transitions (OECD, 2015). Hence, we argue that these theories may have to be adapted to the logic of thinking in terms of policy mixes. Therefore, in the following, we provide a brief overview of the origin of policy mix thinking and recent conceptual advancements in transition studies, and then discuss the implications of this for future research linking transition studies with theories of the policy process.

The usage of the term policy mix started to proliferate in the field of environmental and climate policy (Gunningham and Sinclair, 1999; OECD, 2007). In particular, major empirical advances have been made during the introduction of the EU Emissions Trading System (EU ETS) due to concerns regarding the interaction of this novel market-based instrument with various other policy instruments, such as support schemes for renewable energy (del Río González, 2007; Sorrell and Sijm, 2003). Instrument interactions have also been investigated in other environmental policy fields such as biodiversity conservation (Ring and Schroeter-Schlaack, 2011) or energy efficiency (Rosenow et al., 2016). Similarly, the innovation studies community also started to engage with policy mixes for R&D in terms of identifying instrument combinations most effective in increasing the quantity and performance of research investments (Guerzoni and Raiteri, 2015; Nauwelaers et al., 2009). This increasing academic interest in instrument interactions has been mirrored by an increasing recognition of policymakers and international organisations of the importance to view policy through the lens of policy mixes (e.g. OECD, IEA, and EU). For example, in its recent report on system innovation the OECD (2015) referred to the relevance of policy mixes for redirecting innovation to addressing societal challenges.

However, it has been argued that today's grand societal challenges, such as addressing climate change, call for a broader perspective on policy mixes which does not stop short at instrument mixes, but goes beyond the consideration of instrument interactions (Rogge and Reichardt 2016; Rogge et al. 2017). First, directing innovation towards sustainability requires greater analytical attention to credible long-term policy strategies with stable and ambitious targets (Weber and Rohrer 2012; Rogge et al., 2011; Schmidt et al., 2012), such as the recent Paris Agreement (Kern and Rogge, 2016). Second, it has been argued that policy mixes aiming at structural change may need to pursue simultaneously the 'creation' of green innovation as well as the 'destruction' of incumbent systems (Kivimaa and Kern 2016; Rogge and Johnstone 2017). Third, there is a critical appreciation that real-

world policy mixes may never be completely consistent and coherent, particularly in the context of sustainability transitions where green niches compete with established regimes and respective policies (Quitow 2015; Rogge and Reichardt 2016; Flanagan et al., 2011). Yet, despite these political and practical limitations, enhancing coordination across governance levels and policy fields is discussed as a mechanism to improve the effectiveness of these mixes for stimulating innovation (Magro et al., 2014; Matthews, 2011). Fourth, attention has also shifted to the co-evolution of policymaking and socio-technical change and thus to dynamic changes in policy mixes (Hoppmann et al., 2014; Reichardt et al., 2016; Schmidt and Sewerin 2017).

Within this emerging literature on policy mixes for innovation and sustainability transitions, the importance of considering policy processes has been explicitly acknowledged (Flanagan et al., 2011; Quitow, 2015; Rogge and Reichardt, 2016; Reichardt et al. 2017). For example, Rogge and Reichardt (2016) have included them as one of three building blocks in their extended policy mix concept for sustainability transitions. It is argued that policy processes should be explicitly studied not only due to their explanatory power regarding the design and evolution of policy targets and instruments, but also due to their potential influence on innovation (Reichardt et al. 2017, see 2nd criticism below). Therefore, a greater engagement with theories of the policy process is desirable in order to address the call for more research on the links between policy processes, policy strategy and instruments, and socio-technical change. In this paper we have taken a first step by providing a critical stocktaking as a prerequisite to addressing this challenge. We argue that future interdisciplinary work will greatly benefit from drawing on theories of the policy process from the field of policy sciences for the task at hand. This may often include further conceptual advancements of these theories such as done by Edmondson et al. (2017) to enable analysis of policy mixes rather than single policies or coherent policy packages only.

3.2 The neglect of linking policy outputs with policy outcomes and impacts on socio-technical change

A second shortcoming of much policy process research is that studies typically do not include the impact of policy. That is, while they help explain how, why and when policies – may those be specific policy instruments, policy strategies, or combinations of different instruments in instrument mixes or policy packages – were adopted, studies typically do not cover how these policy outputs lead to policy outcomes and impacts on the socio-technical system. In theory this is part of the research agenda of policy process research according to Weible (2014, p. 5) who defines policy process research “as the study of the interactions over time between public policy and its surrounding actors, events, and contexts, as well as the policy or policies’ outcomes”. However, in practice, studies often do not extend to study outcomes empirically. Moreover, we argue that most approaches lack the theoretical foundations and methodological tools for studying outcomes. Only policy feedback theory is to some extent interested in how policies shape politics which then has effects on further policymaking.

We argue that to be of full value to policymakers and scholars interested in governing sustainability transitions, future analysis should fill this gap. This requires an interdisciplinary approach that combines insights from theories of the policy process with impact analysis. Depending on the entry point of scholars, this can be seen as an extension of studies analyzing the impact of policies on socio-technical systems by incorporating policy process theories explaining the adoption of specific policies, including their goals and design. Scholars could view this extension also the other way

around by extending the analysis of the emergence of certain policy outputs to include their outcomes. We argue that both entry points are possible and that in both cases future research should investigate both the direct and indirect links between policy processes and sustainability transitions and the co-evolution between policy and socio-technical change (Rogge and Reichardt 2016; Schmidt and Sewerin 2017).

The indirect link studies how policy processes help explain policy outputs (such as new policy instruments) which then generate policy outcomes (e.g. increased diffusion of renewable energy technologies) and ultimately impacts within the socio-technical system (e.g. reduction of carbon emissions, change in industry structure and power relations), thereby connecting processes with impacts. We think there are at least two advantages of such a more comprehensive approach to policy analysis. First, by extending the scope of the analysis the assessment of policy outputs and impacts can incorporate the context of how a policy has come into existence (such as the driving and opposing forces), how the policy design may reflect the power of vested interests, or which coalitions have argued with what stories in favour or against the adoption of the policy output. This may facilitate the investigation of policy impacts by highlighting which actors to take into account in the assessment, how to draw the system boundaries, or which expectations to look out for. Second, such a wider scope allows the analyst to take into account the politics when drafting policy recommendations on the design of policies but also on procedural aspects. Such a proactive inclusion of the nature of policy processes in designing recommendations goes beyond a reactive assessment of their political feasibility.

The direct link investigates how policy processes impact socio-technical change independently of policy outputs. Such a direct link could, for example, occur through the effect of a participatory policymaking style on guiding visions, shaping expectations, and orienting beliefs towards sustainability objectives which in turn may, for example, impact innovation activities of firms and thus contribute to sustainability transitions (Reichardt et al. 2017). Another option to consider is that attention to policy processes may help explain socio-technical change through their effect on policy mix characteristics, such as the credibility of policy mixes (Rogge and Reichardt 2016). For example, if policymakers announce that they do not believe anymore that a certain long-term target (e.g. for electric vehicle roll-out) can be achieved, then this is likely to reduce innovator's beliefs in the firmness of the political will in doing what is needed to secure target achievement, which may impact their own innovation efforts. Another example of reducing policy credibility is when policymakers initiate discussions on terminating certain policies promoting green niches. Such public debates generate uncertainty among innovators and can therefore negatively impact on innovation and thus slow down sustainability transitions (Reichardt et al. 2016).

4. Conclusion

Given the potential of using policy process theories in transitions studies, the ambition of this survey paper was twofold: first, to provide a critical review of key policy process theories; and second, to provide meta-reflections on how to analyse policy and policy processes as part of wider transition dynamics.

Regarding the former, we have undertaken a selective review of five major theoretical approaches from the field of policy sciences.⁶ The survey has identified the origins, key concepts, empirical applications and methodologies, further conceptual developments and key criticisms of these approaches to help transition scholars orient themselves in this extensive literature. Importantly we have also reviewed where these approaches were already used in transition papers and highlighted some promising areas of work on the politics of transitions for which these approaches are well suited. The idea was not to identify one ‘best’ policy process theory but rather to discuss their different strengths and weaknesses. That is, we have argued that transition research would benefit from drawing on theories of the policy process, but choosing the most appropriate approach for the research question at hand requires sufficient knowledge about the options.

Regarding the latter, we argue that there is much potential for cross-fertilisation of ideas across transition and policy studies. However, we identified two generic shortcomings in policy process research which further theorising on the co-evolution of policy mixes and socio-technical systems should address: First, while policy process theories are often applied to the study of individual policy instruments or packages, in the context of transitions we need to be thinking about broader policy mixes since there are no single ‘silver bullet’ policy solutions. Second, many empirical policy process analyses stop at the output of policy processes and do not study policy outcomes which are very important for scholars interested in sustainability transitions. Future research should thus pay greater attention to the relationships and causal processes linking policy processes, policy outputs and socio-technical change.

Acknowledgements

The research on which this paper is based has been enabled through the Centre on Innovation and Energy Demand which is funded by the Research Council UK’s EUED Programme (grant number EP/K011790/1). This funding is gratefully acknowledged. We would like to thank two anonymous reviewers, Marc Hudson and participants at the 2017 IST conference for useful comments on an earlier version of this paper.

⁶ There are, of course, other potentially relevant analytical approaches which were beyond the scope of this review.

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